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The Chronicle

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BARBED WIRE, WESTERN PLAINS OPENER

By Raymond Townsend and Parker Crutchfield

The words "barbed wire" do not sound romantic or exciting! Barbed wire rusting in some farmers fence corner, hanging loosely from a rotted post or even newly strung, banjo tight barbed wire with its menacing barbs ready to repel the advance of any creature foolhardy enough to tangle with it seldom stirs the imagination. And certainly the farmer or cattleman who has to string the wire for fencing looks on it simply as a necessary chore.

It is just as well, for all American history, all history for that matter, has been overcolored by the romantic, the things which catch the imagination and distort the truth.

It must have been with a mixture of joy and consternation that the first farmers, moving westward from the East first looked upon the great expanses of The Great Plains. Their delight in noting that in all the land there were no rocks or stumps to plow around must have been tempered with the realization that neither were the rail fences of their homelands practical in these great areas.

Already before the farmers had come the nomadic cattlemen had pushed ahead and were moving thousands of cattle East through Abilene and Chicago. For the railroad, too, had stretched its snakelike way across the plains, swiftly, without stopping much to investigate in between.

Under the impetus of the development of the steel plow in the thirties and the reaper, followed by the Homestead Act of 1862 the stage was almost set for a vast agrarian movement to the West. The railroad had already probed its way into the vastness.

But the movement was halted by the lack of fencing. The farmers found that the great herds of cattle ruined the crops which they planted. Intense rivalry arose between the cattlemen, restless nomads, and the farmers.

And now comes barbed wire, cold, efficient, but effective for fencing great areas. It was coldly efficient, too, years later to form entaglements on the battlefields of Europe where hundreds of descendants of the adventurous farmers died cursing this very device which enabled their forebears to find a new life.

Barbed wire was first patented under a French patent given to Grassin and Baledans in 1861. It is not an American invention. In France, too, was the first barbed wire fence (Byrn, Edward W., *The Progress of Invention in the Nineteenth Century*, p 388).

In 1873, twelve years after the French invention, a county fair was held in DeKalb, Illinois. To that fair came three friends, Joseph Farwell Glidden, Jacob Haish and Isaac Ellwood. Undoubtedly, like most of the visitors there, they were out to enjoy themselves and admire the fat cattle and the farm produce which was on exhibit, to see the latest in plows and reapers and to generally have themselves a good time with their neighbors. But each must have been more than a little struck by the exhibit of a barbed fencing invented by Henry M. Rose, for both Glidden and Haish went home and thought over the great possibilities of a practical barbed wire fencing.

The pause in the westward agrarian movement was about to give way to a great acceleration and the usual displacement of the nomad by the settled farmer.

In October, 1873, improvements having occurred to him, Joseph Glidden, applied for a patent on barbed wire. Two months later Isaac Haish applied for a patent on his idea of a good barbed wire. Neither claimed to be the inventor of barbed wire; both merely claimed to improve on the existing wires. Since Haish challenged Glidden's priority to the patent the matter had to be settled in the courts. It was settled in Glidden's favor in October of 1873 and he was granted patent number 157, 124 in November of the same year.

"The important feature of this patent is the novel method of holding the spur wires in place; and when subsequently it was placed on the market it proved superior to other forms of barbed wire. It is still in active demand after more than half a century. It is the sole survivor of hundreds of early styles." (*Dictionary of American Biography*, Vol. 7, p 331).

Glidden, with his patent right secured by the court decision, sold a half interest in his patent to a neighbor, Isaac L. Ellwood, supposedly for $265, and together they set up the Barbed Fence Co. in DeKalb.

It is interesting to note that Glidden, in his improvement of barbed wire for fencing showed the same Yankee ingenuity which so many of his fellow inventors had shown. Apparently he utilized parts of coffee mill for his "machine." In his home in DeKalb his first piece was made by twisting two strands of wire together to hold the barbs. Mrs. Glidden turned the small crank of a grindstone, the wire tightened on the crank and could be removed only by cutting with a cold chisel.

The scene now shifts back, back to New England to the industrial firm of Washburn and Moen Manufacturing Co. This company was a great producer of drawn wire and used a method developed by Ichabod Washburn in 1831, or at least improvements of it. Washburn had contrived a device utilizing the draw block, a circular drum which did the work of drawing the wire through the plate and at the same time wound the wire upon itself, multiplying the output and setting the stage for future developments.

In 1876 the Washburn-Moen Co., noting with surprise its growing orders for wire from far off DeKalb, investigated. They then bought from Glidden his interest in the Glidden patent for $60,000, plus a large royalty for life. This seemed to end Joseph Glidden's interest in barbed wire except for the collecting of royalties which he drew until 1891. (DAB, Vol. 7, p 331).

Meanwhile Jacob Haish had received a patent for his barbed wire in August, 1875. His invention, the then famous "S" type wire was widely popular, had a brisk sale and was the only competitor of note to Glidden. In 1876, when Washburn and Moen, of Worcester, Mass., attempted to control the manufacture of all barbed wire and had bought Glidden's patent, they also attempted to buy Haish's patent. Haish refused to sell and there followed much litigation which lasted until February 29, 1892, when the Supreme Court decided in favor of Washburn and Moen. Haish may have been clever with ideas but he seemed to be uncommonly unlucky in the courts!

Production of barbed wire on a large scale precipitated a bitter war between the cattlemen who believed that it was their right to allow the cattle to roam at will, since they had dared the dangers of the wild to break the trails in the West, and the farmers who rushed westward to set up their fences. And though the great advantage in barbed fencing seemed to lie with the farmers, it finally happened that both cattlemen and farmers benefited by the invention. The use of the wire even spread in a backwash to the East where it finally replaced, for the most part the traditional and now picturesque rail fences.

The use of barbed wire now increased tremendously and many companies sprang up to produce it in some form. The speed of its growth may be seen by the following table, showing the estimated amount of barbed wire manufactured and in use during the years named.

Year	*Tons*	*Miles*	*Year*	*Tons*	*Miles*
1874	5	10	1881	60,000	120,000
1875	300	600	1882	80,000	160,000
1876	1,500	3,000	1883	100,000	200,000
1877	7,000	14,000	1884	125,000	250,000
1878	13,000	26,000	1885	130,000	260,000
1879	25,000	50,000	1886	135,000	270,000
1880	40,000	80,000			

(Homemade Contrivances, Orange Judd Company, New York, 1899.)

Despite its rapid use and rise to popularity "bob wire" as it was called by many a grizzled farmer came in for its share of criticism. The most persistent criticism was that the sharp barbs of the fencing might cause serious injury to valuable domestic animals which might come into contact with them.

Despite this criticism the wire had many obvious advantages. It was economical, not only in its original cost as compared to other fencing materials, but also in the small amount of land covered by it. It was generally effective against all kinds of stock and it could be strung quite rapidly. Snow drifts did not form against it, either, a great fault with the worm fence made of rails. Also it was durable.

So in the space of less than a quarter of a century and because three friends had visited a fair and seen Henry Rose's barbed fencing — which apparently had wooden links with barbs attached — fencing and the manufacture of materials for it had undergone a sweeping change. The change took place without the romanticism of story and song which had grown up around the cowboy singing to his little dogie and the wild exploits of the hard pressed Indian who from the beginning waged a losing war for his lands and freedom.

Barbed wire has the characteristics of the age which produced it, the age in which was gathered together the fast growing, unyielding mechanization and industrialization of America. And the men who developed barbed wire so that agriculture could advance were men with the quick minds and clever hands of the earlier craftsmen as well as the desire to produce quicker which has resulted in the vast production of the twentieth century.

The Dictionary of American Biography gives a concise biography of both Joseph Farwell Glidden ("January 18, 1813-October 9, 1906, farmer, inventor, capitalist, born in Charlestown, Sullivan County, New Hampshire.") and Jacob Haish, ("March 9, 1826-February 19, 1926, contractor, inventor, manufacturer, born in Germany, came to United States at the age of ten.") the two men given most of the credit for the practical development of barbed wire.

Of course, the Washburn-Moen Manufacturing Company of Worcester, Mass., provided the ability to produce quickly, cheaply and efficiently this wire which opened the Great Plains to agriculture.

But it might be well for us today, with our great steel companies producing tons and tons of barbed wire, to remember that wire drawing is of great antiquity, and that in 1666 Nathaniel Robinson of Lyn, Massachusetts, petitioned the court for aid in his "wyer" drawing and was refused. And a year later Joseph Jenks, called by some the first American inventor of any importance, approached the court of Lyn, "being informed that there are in this towne a sett of tools for Wyer drawings, and that there be some in that place that are skillful in that employ," to disburse forty shillings to encourage "those who shall make cards and pins of such wyer."

So even the coldly efficient and impersonal machines of the present, the vast productive capacity, have as their foundations the thoughts created in the minds of all men who have strived for the better. And barbed wire, invented by no one man, is no exception.

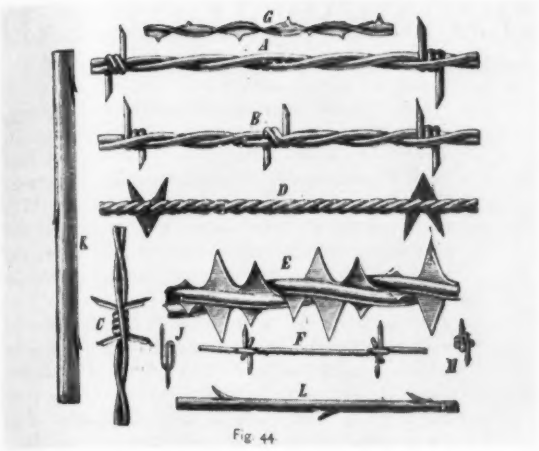


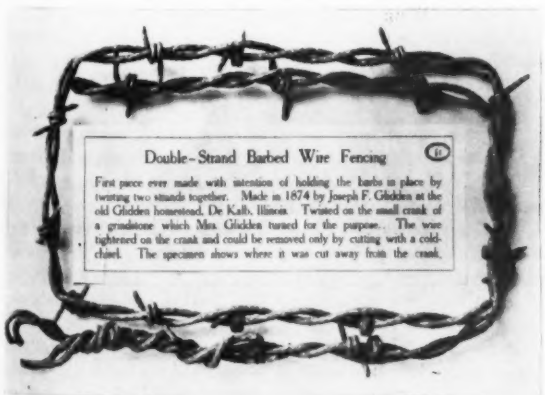
Fig. 44

TYPES OF BARBED WIRE

Braunt, William T., Editor, "The Metal Workers Handy Book of Receipts and Processes"; Henry Carey Baird Co., Philadelphia, 1896, p 454.

A to C: Galvanized steel wires twisted into a cord and provided with sharp pointed barbs. (Glidden) D: Three steel wires between which are placed sharp sheet steel points. E: Barbed wire by Bernhard Ebeling, Bremen, Germany. J: The barb. F and H: Methods of fastening the barbs. K and L: Other types.

Part of the famous "Coffee Mill" used by J. F. Glidden in the year 1874 at his home in De Kalb, Illinois, to form barbs for the first Glidden barbed wire fencing.


Double-Strand Barbed Wire Fencing
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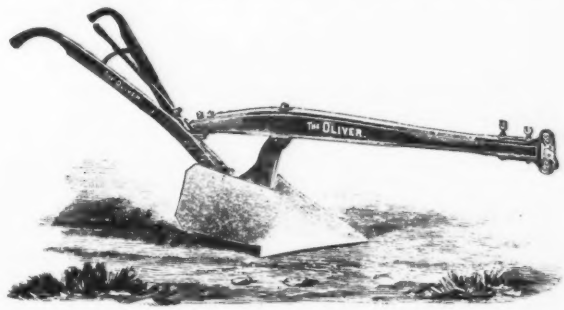
First piece ever made with intention of holding the barbs in place by twisting two strands together. Made in 1874 by Joseph F. Glidden at the old Glidden homestead, De Kalb, Illinois. Twisted on the small crank of a grindstone which Mrs. Glidden turned for the purpose. The wire tightened on the crank and could be removed only by cutting with a cold-chisel. The specimen shows where it was cut away from the crank.

Courtesy Smithsonian Institute

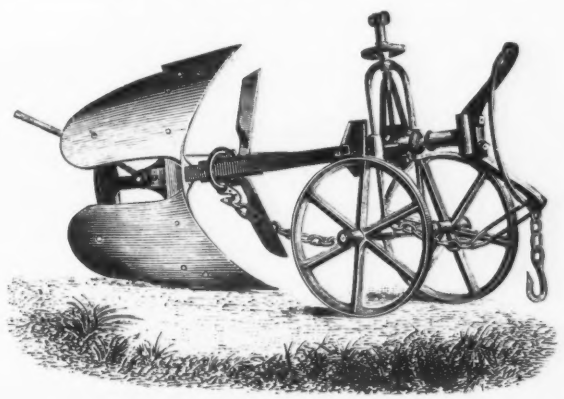
SIDE HILL PLOWS

CONTRIBUTED BY F. HAL HIGGINS

The side hill plow is apparently of very ancient origin and over the course of centuries has acquired such names as the turn wrest plow, swivel plow, the one way plow, the two way plow, the Brabant plow, the reversable plow, the roll over plow, and others. As early as the 12th Century the turn wrest plow was known and by the late 18th Century had become associated with the County of Kent in England where it was widely used. This simple plow had a mold board so arranged that it could be swiveled under the beam so as to throw a furrow either to the right or to the left. In America this principle was improved by Thomas Mann Randolph of Virginia in the first decade of the 19th Century and after many subsequent developments it took the final form of the Oliver Plow here illustrated (1898). The desire for a plow which could be used on hill sides and which would always throw the furrow in the same direction, upwards, regardless of the direction in which the plow was being operated, led to many other ingenious devices.



Another early plow was the Brabant Plow, developed in the Low Countries in Western Europe. This plow actually consisted of two complete plows, one right and one left handed, mounted on a swiveling beam in such a fashion that only one entered the ground at a given time. The *Scientific American* of September, 1878 illustrated this plow as finally developed and factory manufactured by the French. The illustration below shows this plow.



(Continued on Page 11)

The Chronicle

SHIP BUILDING IN EARLY NEW ENGLAND

By Edwin C. Whittemore

Treenails, Futtocks and Deadwood . . . Stevens, Hollingsworth and Perley . . . Three Brothers, Five Sisters, and Grampus . . . a rugged he-man wearing a veil . . . a workday covering 4:30 a. m. to 7:30 p. m. . . . a weaving column of over 100 pair of oxen ambling over sunny New England fields toward a river gleaming in the summer sun . . . . . all these are a part of the story of ship building in early New England!

The Pilgrims landed at Plymouth in 1620. Immediately their lives were dominated by the raw struggle to stay alive, and there was no time to do long-term planning. Yet throughout those first bitter discouraging years we find an amazing interest in, and devotion to what was the beginning of the ship building industry in this country. Note in what quick succession after 1620 the following took place:

When warm weather came that first Spring of 1621, the men of Plymouth, guided by a carpenter who had come with them on the *Mayflower*, built "2 very good and strong shallops and a lighter." In 1629 it was recorded in the London books of the Massachusetts Bay Company that Robert Moulton, an experienced shipwright and five others had been sent to New England. That same year 1629 instructions were sent from London to John Endicott which included the information that the following supplies had been shipped to him, "the provisions for building of shipps . . . as Pitch, Tar, Rozen, Okum, old ropes for Okum, Cordage and Saylcloth . . . 9 fferkins and 5 halfe barrells of Nayles."

In 1631 the famous "Blessing of the Bay" owned by Governor Winthrop was launched outside of Boston at Medford. By 1634 a merchant of Marblehead, Mass. was the individual owner of eight fishing craft, and by 1634 the town of Portsmouth, New Hampshire, had six shallops, five fishing boats, and 13 skiffs. In 1641 ordinances were passed covering the inspection of ships during the building process . . . sure evidence of the growing importance of the industry! In 1642 there was printed in London "New England's First Fruit" and the entry reads "Besides many boats, shallops, hoys, lighters, and pinnaces, we are in a way of building ships of 100, 200, 300 and 400 tons. Five of them are already at sea."

By 1644 there was a ferry operating across the Merrimac River, . . . in 1655 the town of Newbury, Mass., granted a land grant for a wharf. At about this same time a group of proprietors of ship yards in England petitioned the authorities to forbid shipwrights to go to New England, so many had done so. In 1677 there were town laws against felling timber on the Town Common as eager ship builders were cutting everywhere. In 1692 the town of Newbury, Mass, passed an ordinance. "Whosoever shall build any vessel on the Town Common shall pay to the Town three pence per ton for the use of the building yard".

Even these sketchy statistics indicate that in spite of hardship and many complications of daily living, ship building grew with enormous vigor and vitality during those early years. Why? The answer is found in a combination of many circumstances:

1. *Necessity.* The finding of food was imperative. Fishing was one of the easiest ways to food. Fishing required boats and ships.
2. *Trade.* Colonization was a business proposition so far as the backers were concerned. Though individuals and families may have come to New England for reasons of religious freedom, they were backed financially for investment purposes. The backers demanded shipments . . . if not gold and silver as once dreamed, then furs and timber and produce. To move goods to England called for ships.
3. *Transportation.* The use of boats and ships was the only practical method of transportation between the various settlements in New England. A well-used road of that early period was a rut-like track through the woods about 24 inches wide. Even when oxen and ox carts came into use, the forest trails were so rough it took an hour to go each mile. Thus up and down New England, people and things moved by water. The ships went to where the people lived and worked and prepared their products; rather the people taking their goods to the ships or central markets. New England is a territory of navigable bays, inlets, rivers, all leading to a concentrated coast line. Ships went up these bays and rivers to pick up their cargos . . . far inland, in Great Bay behind Portsmouth, up the Merrimac River to Haverhill, and to many many more inland wharves. Ships carried goods and people, so ships were needed.
4. *Raw Materials.* The industry of man is often dictated by the materials around him, and New England's natural resources fostered ship building. Fine timber was handy, plenty of the Red Oak, White Oak, Locust and White Pine that was desirable for ship construction. In addition to timber there was iron from Saugus and from the Plymouth area as early as 1643. By 1648 Saugus was producing 7 tons of iron a week. Then too, the friendly Indians, long skilled at building their birch bark canoes, taught the colonists the use of hot pitch from balsam and spruce, and the making of cordage or rope from wild hemp. So the materials for ship building were at hand.

All four reasons helped accelerate the development of this infant industry.

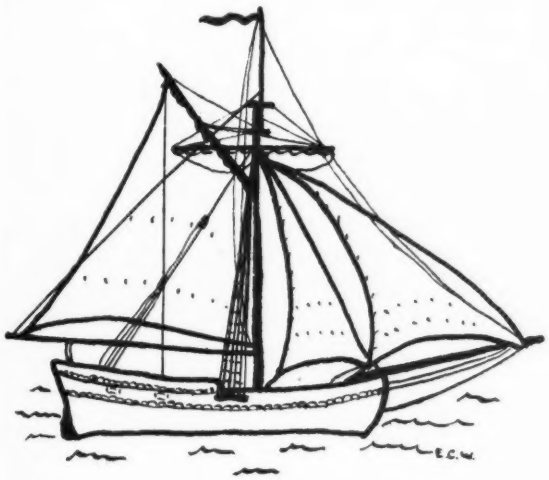
When and where did ship building actually begin in New England?

There seems to be some difference of opinion as to just when the first ship was actually built within New England territory. In one case we have the record that a group of men settled near the mouth of the Kennebeck River in Maine in 1607 to conduct a fishing station. Becoming homesick and discouraged, and without waiting for their relief by ship, they built a 2-master of about 60 tons as soon as the bitter winter was over, named her "Virginia," and abandoning the project, sailed away in the ship they had built. There is also the story of a group of men from Virginia who went north along the coast in 1614, seeking gold and silver. Finding none, they turned to fishing, building their fishing craft in the same general area of the Kennebeck River mouth

in Maine. Probably the two groups were one and the same. In any event, whether the date is 1607 or 1614, the place was Maine near the mouth of the Kennebeck River, it was before the Plymouth Landing, and it was in connection with fishing that the first ship was built.

At this point with the facts as a matter of record, and the reasons quite self-evident, it seems an accurate statement to say that ship building as an industry flourished with feverish growth and activity in early New England; sponsored by individual enterprise, the backing of local colonial leaders, and by financial backers from England. It then becomes interesting to ask these questions:

A. What kind of boats and ships did they build?
B. Where did they build them?
C. How did they build them?
D. What kind of labor built them?
E. What contribution did New England ship building make to the development of ship building as a whole?



An Early Sloop

A. What kind of boats and ships did they build? The most important need of boats was for fishing. Second came their use for the transportation of goods such as firewood to Boston, and imports to outlying settlements. Third in degree of need was Trade, an ever-growing trade with colonies to the South, then with the West Indies, finally with England. Loads were relatively light, manpower for handling the ships were scarce. Obviously a medium sized ship, a utility ship that was seaworthy and easily handled, was the most practical.

To answer these requirements, Sloops were popular, and during the early years, more Sloops were built than any other type. A Sloop in early New England was characterized by: 1. a square stern. 2. a high rear cabin. 3. a long, high-pitched bowsprit. 4. a single mast rigged with a fore-and-aft boom but also with 1 or 2 cross yards for topsails. A typical Sloop of the 1600's might have been 40 feet long over-all, about 29 feet long at the keel, 13 feet wide, and 9 feet deep.

By the system of that day, such a Sloop would have been referred to as about "35 ton" capacity. The term "ton" is a measurement of a ship's capacity load in terms of space. It has been abused, and twisted over the years to fit different situations. However, the most commonly accepted definition or formula in those early New England years was:

Keel Length x Ships Breadth x Ships Depth

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A list of boats and ships built in New England between 1674 and 1714 shows the following quantities in the different types:

560 Sloops	82 Ketches
439 Ships	29 Barks
278 Brigantines	14 Pinks

"Ships" indicated larger vessels, more of which were built as years went by in order to take care of longer-distance trading. However, the list does not include many types that are often referred to: Shallops, Lighters, Keys, Pinnaces, Schooners. As in the case of the term "ton", terminology was confused, and varied depending upon the period, the area, the use, the builder, and local customs. Only a true student of naval architecture could attempt to trace and define the true development and change in the various classifications. For example a Shallop was anything from a ship's open long boat to a decked 2-master. Any individually conceived minor change in the rigging might produce a new name or a different classification. There was tremendous variety.

B. Where did they build them? Geographically they were built in many locations along the New England coastline . . . the divided waterways about Boston; the harbors of Marblehead and Salem; famous Lobster Cove outside of Gloucester on Cape Ann; Newbury near the mouth of the Merrimac; Portsmouth and Portland. Specifically they were built near the homes of the builders, and not necessarily near the water's edge. It took time to build a good sized ship . . . usually at least a year; and some of the better builders only undertook to produce one ship each three years. That meant long months of daily labor at the task, and as there was no quick and easy transportation, it was much simpler to build close to home. Home was often at a spot advantageous to good living conditions, a good water supply, good timber, or fertile land for gardening. The proximity of the growing ship to the homes of the workers was important . . . once the ship was built, some way would be found of launching it! Thus we find the incident of the 100 pairs of oxen at Rowley Mass where a ship was built in the village near Rowley Common, a good 1½ miles from the water. When ready for launching, settlers from miles around were summoned with their oxen, and using great wheels and rollers, a serpentine column of slowly ambling oxen dragged the ship to the nearest launching place.

C. How did they build them? They were built laboriously, painstakingly by minute individual hand processes and operations. The tools were the simplest in this early period, . . . the saw, the broad-axe, the adze, the pod auger, possibly a crude plane. Individual cutting and shaping of each piece was required, to properly mate with its predecessor. Before 1795 a ship builder approached his task with little but rough scale models showing the construction or outline of the ribs, keel, stem and stern. In the entire first 125 years of ship building, there was little to indicate the finished shape or

form, other than the crude skelton. This may account in part for the great variety of models within the same general classification of ship. Later it was customary to first make a model from which three sets of plans were drawn:

The Sheer—the profile or broadside view.

The Body—the shape of the various sections, crossways of the ship.

The Half-Breadth—showing the hull from above, indicating the shape at various levels, parallel to the keel or waterline.

The saw or whip-saw was the most important tool. The saw was used on a staging or over a dug pit. With one man above and one below, planking and heavy timber were cut in single lengths, one by one, through the process of laboriously sawing the length of the log. Men worked in crews, and a "sawyer" was one of such a crew. Sometimes men worked as a "Gang" of three, the third man alternating at the saw and also shifting the log's position at intervals, or helping to start a new cut. The underman on the saw, bothered by the constant drifting of sawdust into his face, often wore a veil; while some became adept at handling the lower end of the saw while facing away from the log, the sawdust following on their backs. Because this cutting of timber was slow, laborious and expensive, few builders cut in advance of a job. It is an unfortunate fact that in spite of the American traditions of good workmanship, many of the early ships were built of green lumber, and were not actually well built.

The building of a ship such as a 50 ton Sloop took place in various steps, which may be outlined very briefly by naming the parts in order of assembly into the finished ship:

1. The keel
2. The stern unit
3. The sternpost
4. Ribs
5. Deadwood (narrow areas at bow and stern)
6. Floor timbers
7. Futtocks (curved side timbers)
8. Keelsons (lengthwise base timbers)
9. Boarding and calking inside.
10. Frame bracing
11. Interior planking and ceiling
12. Deck Supports
13. Decking
14. Breasthooks and crutches for rigidity

As has been mentioned, red and white oak, locust, and white pine were the common materials. Larger curved pieces were usually cut from large naturally curved tree sections. There was some shaping of smaller pieces. Joining was chiefly through the bored hole with a "Treenail" peg, made from white oak, usually cut from solid blocks during spells of bad weather when outside work was held up. There were some bolts and spikes, hand forged from the hearth of the local blacksmith. There was some threading of screw bolts by hand. There was no paint in the beginning, the first record we have of paint being used on a ship, being in 1692. Some builders tried to sheath or protect the outside of the hull below the waterline with a sheathing of elm. Others applied a rough coat of a mixture of resin and tallow. For the most part however, the planks were raw and unprotected just as they came from the saw pit, and for that reason their life was limited. Later, as the use of metals developed in the colonies, metal sheathing was used, and it appears that the first copper sheathing of a ship's bottom in New England was in 1760. Ballast was required for balance and seaworthiness but was added after the launching, and usually after the newly launched ship had safely negotiated the shallow narrow neighborhood creek into which it was launched, and was safely in deeper water.

To understand early ship building it is most important to get the picture of individual effort at each step. With no mechanical help, and depending upon muscle, leverage, and rollers only, men did everything. A ship was hand made. Everything was a hand operation . . . the sawing of planks and timbers, the fitting of planking, the shaping of a beam, even the steaming and forming of a curved brace, the fashioning of the wooden fastenings pegs or "Treenails." The growing ships frame was propped up by supports placed by men, the timbers no matter how huge were moved into place by men, masts were stepped by men . . . it was all individual hand craftsmanship.

Working hours were from sunrise to sunset. In the summer months this meant 4:30 a. m. to 7:30 p. m. though an hour off was given at 8 a. m. for breakfast and two hours at noon for dinner.

D. What kind of labor built them? The workers were a strange and motley group: Shipwrights who had learned their trade in England; carpenters also from England who saw in this specialized field a new opportunity; the adaptable hard-working colonist himself, always willing to apply his brawn and his adaptability to a needed task; gangling apprentices whose training later made possible the glory days of American ships in the 1800's; finally negro slaves, not uncommon in New England before the Revolutionary War, often working alongside cheap Indian laborers.

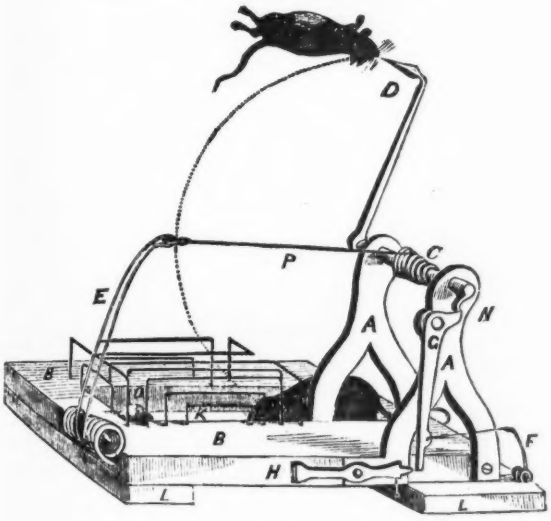
The ship builders themselves were too many to catalogue, with too little precise information about them to grade or distinguish. The Reverend High Peters of Salem was a man of great enterprise and activity who did more than any other one man to stimulate ship building in the Massachusetts Bay Colony. Among the early ship builders was Richard Hollingsworth who built a ship in Salem, Mass., which was launched in 1642 . . . William Stephens who launched one in Gloucester in 1643; Duncan Stewart of Newbury and Rowley; Captain Nathaniel Perley; Giddeon Woodwell who built 52 vessels in all; John Currier, Jr.; B. F. Atkinson and J. T. Filmore; J. W. S. Colby and E. P. Lunt; George W. Jackman, Jr.; the famous Donald McKay; Orlando B. Merrill . . . these are but a few names of men who contributed much to ship building in early New England.

Finances came in a variety of ways. Many ships were built on direct order or commission from individuals or firms in England, or for merchants in the West Indies. Many were built on speculation, then loaded with cargo, and sailed to the West Indies or London where the ship as well as the cargo was sold. It was also a customary thing to sell shares in a ship and its ventures just as corporation stock is sold to the public today. "Taking up a ship" as it was called, became a popular way of investing or gambling depending upon the point of view. Ownership of the ship and its ventures was often divided as finely as 64ths, and while an occasional ship was lost on a maiden voyage, others were extremely profitable! Of course the backbone of the financial backing was in a stream of orders for ships from the individual merchants, partnerships and trading companies whose names have become synonymous with that of success in early New England. Moses Brown, Shaw, Adams, Minturn, Frothing-

(Continued on Page 7)

INTERESTING RAT TRAP

Contributed By Henry J. Kauffman



"Rats are a terrible nuisance to people in the country. Here in the city, however plenty they may be, they are not by any means as troublesome; for there is so much of garbage, and all possible matters for them to eat, that they commonly pay for all they get in the Scavenger work they do. But to the farmer, they are 'Philistines' of the worst class. They dive at his grains wherever they may be, and such are their facilities for getting at them, that often little can be done for them with traps, for they despise the bait offered.

In the cut we have a trap, called Sheward's Patent Rat Trap, which, for "the fun of it" we give without knowing whether it is worth anything or not. It is probable that it may hit some man's case exactly. But we wish to say that the best rat trap is one with four legs, in the shape of a Terrier Dog. The Trap is thus described:

b b are pieces of boards about one foot long, one inch thick, and three inches wide. *l l* are two pieces half an inch thick, nailed or screwed on the bottom of *b b* so as to leave a space of two inches between them. In the space, a platform *k* is suspended and nearly balanced, having weight enough at *o* to keep it in its place; from this platform a wire *i* carries with it the trigger *h*; the weight of a rat on the platform will depress it, and the wire *i* carries with it the trigger *h*. *a a* are upright pieces of cast iron, screwed on the edge of *b*, and are about six inches or more in height and have slots in the upper end in which the lever *c d* revolves; *c d* is a lever, having a sharp spike or spear on the end at *d*, and a compensating pulley at *c*, of such shape as to catch the increase of power of the spring *e*. The end of the shaft at *n* is bent down so as to rest against the pendulum *g*. When the trap is set, the end of the lever *n* rests against the pendulum *g*, which is kept in its place by the trigger *h*. The spring *e* — made of the very strongest and most elastic wire — is continually acting upon the cord *p* in such manner as to press the point *n* against the pendulum, and this pressure is relieved by a small spring *f* so as to prevent friction between the pendulum and trigger. The cord *p* is wound round the shaft *c* a number of times; by reversing the motion of *d*, and the trap is set. A wire cage prevents the rat reaching the bait in any but the right direction. The moment a rat or any other animal enters the trap, his weight depresses the trigger *h*, the upper end of the pendulum is depressed and *n* set at liberty. The force of the spring *e* causes the lever to revolve as quick as thought, the spear on the end at *d* enters the rat's head just between the eyes, penetrating the brain far enough to cause instant death, and retaining the body, continues its motion until checked by the pendulum *g*; the momentum acquired by the body causes it to fly from the spear as soon as the lever stops, and with a good spring, will be thrown 10 or 15 feet away. The trigger always resumes its position as soon as the rat leaves the platform, and the pendulum is instantly drawn into its place by the spring *f*, so that the trap is always set.

The advantages of the trap are, that it effectually kills the animal, and thus prevents any escape; it throws the body away from the trap instantly, and thus prevents any alarm to others. It can never become tainted by the animal urinating in or on it, and is as clean after killing fifty as when new; and is always set ready for successors.

The machine may be seen at Webster's Hotel, Warren Street, New York.

From the *Prairie Farmer*, Jan., 1853

SHIP BUILDING

(Continued from Page 6)

ham, Hale, Coombs; Moses Gale and Oliver Osgood, Samuel Coffin and John Balch. Their names were many, their activities varied.

It was not uncommon to pay for part or all of a ship in agricultural produce. An early contract for the building of a ship specified the thickness of planking and other timbers, and stated that all iron work, nails, pitch, tar, turpentine and oakum were to be paid for by the builder. It went on to say:

> ". . . the payment shall be three hundred pounds in cash, three hundred pounds by order on good shops in Boston, two-thirds in money; four hundred pounds by orders up the river for timber and plank, ten barrels of flower, fifty pounds weight of loaf sugar; one bag of cotton wool, one hundred bushels of corn in the Spring, one hhd. of rum; one hundred weight of cheese."

There is also an incident where a ship builder stated that he had built a "calico" ship. It is to be hoped that he referred to the fact that some of his payment was to be in calico, rather than to the fact that his ship had the sturdiness of mere fabric!

E. What contribution did New England ship building make to the development of ship building as a whole? The answer is "very little" . . . probably best summed up in the single word "speed." Americans have always worshiped speed, and they worshiped it then, particularly in trading voyages. Early New England ship builders added speed to the characteristics of the ships they built. By using concave instead of convex contour lines, by simple changes in design, by ingenious methods of adding more square feet of sail to the same length of masts and cross-arms, they did contribute speed to the ships they built. In this connection it is interesting to note that the mathematical precision of ship building and ship handling was amazingly accurate and detailed many years

(Continued on Page 9)

The Chronicle

Early American

Industries Association, Inc.

The purpose of the association is to encourage the study and better understanding of early American industry, in the home, in the shop, on the farm, and on the sea, and especially to discover, identify, classify, preserve and exhibit obsolete tools, implements, utensils, instruments, vehicles, appliances and mechanical devices used by American craftsmen, farmers, housewives, mariners, professional men, and other workers.

EDWARD DURELL, *President*

500 Dublin Avenue, Columbus, Ohio

LORING MCMILLEN, *Vice-President*

Staten Island Historical Society
Richmond, Staten Island, New York

JAMES A. KEILLOR, *Vice-President*

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Farmingdale, Long Island, New York

MISS JANET R. MACFARLANE, *Secretary*

Farmers' Museum
Cooperstown, New York

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51 Paxton Street, Leicester, Mass.

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Poughkeepsie, New York

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Editors of The Chronicle
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Worcester, Mass.

Communications regarding the contents of *The Chronicle* and back issues should be addressed to the Editor; suggestions for members to Robert G. Hill; all other matters to the President. Addresses as here given.

DUES

The annual dues are payable January 1st, and are as follows. Active members $5.00; Helpful members, $7.50; Encouraging members, $10.00; Enthusiastic members, $15.00, and Delighted members, $25.00. There is no distinction between classes, except the amount of dues, but *The Chronicle* cannot be financed unless a considerable number of the members pay more than $5.00. Each member is expected to voluntarily place himself in the class which represents the amount he is willing to contribute to the support of the Association for the current year. Life membership costs $50.00. *The Chronicle* is sent to all members without additional charge.

Printed on the Press of The *Virginia* Gazette, *Founded 1736.*

SPRING MEETING

The Spring Meeting of the Early American Industries Association will be held at Old Sturbridge Village, Sturbridge, Massachusetts on June 24, 25, and 26. Members should plan to attend this meeting now and full details will appear in the April Issue of the *Chronicle.* One of the interesting features of this meeting will be our second auction. Many of you will remember the highly successful auction at the Shelburne, Vermont meeting in the summer of 1953. This auction was conducted by one of our most valued members, Mr. George Simmons and was extremely beneficial to the Association. Details of the Sturbridge Auction are to be found on the back of the current advertising insert.

MEMBERSHIP SUGGESTIONS

Mr. Robert Hill, Chairman of the Membership Committee, has just noted that one of our members has donated two additional memberships to public libraries in his area. Mr. Hill notes that this is an excellent method for increasing memberships in the Early American Industries Association by Public Institutions. Perhaps other members of our organization would be interested in checking with their local libraries and historical associations and donating memberships to them if they are not members of the Association.

INDICES AND BACK ISSUES

The following information is presented for the interest of the members of the Early American Industries Association: All back issues of the *Chronicle* and Indices are stored in Williamsburg and may be had by writing to the Editors. They are priced as follows:

Indices to Vols I, II, and III are priced at $1.00 each and may be secured by writing to the Editors.

Index to Vols IV and V (printed together) are priced at $.25.

Price list for individual copies of the *Chronicle:* (numbers not listed are not available).

Vol. I, Numbers 5, 13-17, 19-24 are priced at $2.00 each.

Vol. II, Numbers 1, 3, 5-7, 9, 10, 13, 15, 17-19, 21-24A are priced at $1.00.

Vol. III, Numbers 1-16, 19-24 are priced at $1.00 each.

Vol. IV, Numbers 1-4 are priced at $1.00 each.

Vol. V, Numbers 1-4 are priced at $1.00 each.

Vol. VI, Numbers 1-4 are priced at $1.00 each.

Vol. VII, Numbers 1-4 are priced at .50 each.

Mr. Thomas E. Barns, Box 315, Milford, Mass., has just notified the Editors that he has a set of *Chronicles* running from Vol. I, Number 1 through Vol. VI, Number 1 with exceptions of numbers 7, 10, 11, and 12 of Vol. I. Anyone interested in securing these should write directly to Mr. Barns.

WHAT IS IT?

Janet MacFarlane of the Farmers Museum, Cooperstown, New York has forwarded the interesting picture below of some tools used in the making of hair-wreathes. Miss MacFarlane writes that she has no information describing the method of manufacture and wonders if someone can provide this. The Editors would like to point out the similarity of the implement on the left to the device used by wig and peruke makers in the eighteenth century to weave their weft for wig manufacture.

Mr. David N. Bunn of 47 Oakridge Avenue, Nutley, New Jersey, writes in reference to the picture below: "A gentleman at the Smithsonian Institute suggested writing to you in the hopes that you could identify the object shown in the enclosed photograph. This is supposed to be a thatch roof needle and has been in my family for at least a hundred years. It is 14 inches across with an eye on one end and a point on the other. It is iron, 5/16" wide and 3/16" thick." Please let Mr. Bunn have any ideas that you can come up with.

SHIP BUILDING

(Continued from Page 7)

ago. Culture had been centered in the area around the Mediterranean Sea for centuries. In this area ship building had become a highly developed art in every phase except that of building ships to ride the high stormy seas of the open ocean. Thus the mechanics of sailing had been established, and though ship building itself in early New England was crude, the fundamental theories had been previously worked out in detail. The first encyclopedia printed in this country in the 1700's has a long and detailed article on ship building with intricate mathematical formula and information. All New England ship builders contributed was a greater rate of speed through the waters.

Timber so plentiful in the early days that one builder reported cutting a tree 8 feet in diameter at the butt grew less abundant close to the waterways and timber crews went farther up the rivers, cutting into virgin stands of timber, dragging them to water with oxen, floating them down stream to the Newburys and towns like them. One hundred ships were built in Newbury alone between 1681 and 1714. Three Brothers, Five Sisters, and Grampus were names of early ships from this area, and the types and sizes are indicated by these entries in the old records:

"Neptune"	Brigateen	40 tons	Built in Ipswich
"Unity"	Sloop	20 tons	Built in Newbury
"Tryal"	Barque	35 tons	Built in Newbury
"Diamond"	Sloop	30 tons	Built in Ipswich

All this activity created a great call for timber. In 1793 the Massachusetts authorities became so disturbed over the indiscriminate cutting of timber everywhere that the official publication for that year entitled "The Town Officer, or The Power and Duty of Selectmen, Town Clerks, etc." quoted the laws of Massachusetts which at that time imposed fines for cutting white pine on property not under individual property title. The fines were three pounds on anyone cutting white pine under 24 inches in diameter; thirty pounds if over 24 inches, unless licensed by the legislature. Of this fine, one third went to the Informer, two-thirds to the Commonwealth.

There is one curious vacuum in the records of early ship building. Little information exists with regards to the sails themselves, what they were made of, who made them, and how. We find frequent references to "Saylcloth," and we know that some homespun linen was used for making sails, but we know little more. Cordage of course was made commercially in Boston as early as 1630 and in 1629 there is definite record of hemp seed being shipped from England to Massachusetts for cultivation for cordage use.

The glory days of New England shipping came later . . . days of the famous ships like The Flying Cloud, The Westward Ho, The Empress of the Seas, The Lightning, The Flying Fish; days of big fortunes made at sea through the China Trade, fortunes often made in a single voyage by a ship captain in his mid-20's. But to the ancestry of these more famous ships and their builders . . . to the humble Lydias, and Livelys and Larks that plied the rivers and coastlines of New England in the 1600's and 1700's, . . . to them and their builders the story of the ship building industry in America owes much.

The Chronicle

NEW JERSEY IRON EXHIBITION

By Patricia de Hahn, New Jersey State Museum

A loan exhibition of "New Jersey Iron 1674-1850" was held at the New Jersey State Museum, Trenton from May 16 to October 31, 1954. This was the third in a series devoted to early arts and crafts of New Jersey, the two prior exhibitions being "Paintings, Silver and Glass 1750-1850" and "Furniture, Pewter and Samplers 1695-1840." The subject of iron was selected for this exhibition because of the major role that New Jersey played in the industry during colonial times.

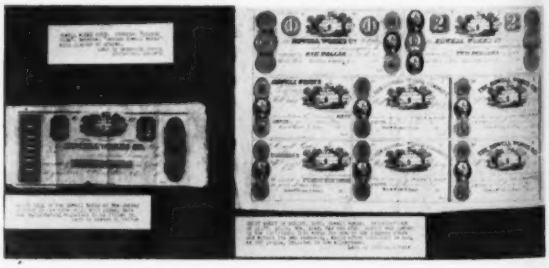
New Jersey's history of forges and furnaces began in 1674 with Shrewsbury Furnace, also known as Tinton Falls Iron Works, in Monmouth County. Although there were hundreds of forges and furnaces operating in New Jersey during the seventeenth, eighteenth and early nineteenth centuries, the Museum exhibit gave a representative picture by presenting the history of seventeen iron works for which original materials could be made available by private collectors, museums, historical societies and libraries. Through these materials and others the importance of the iron industry in the Revolutionary War, on the farm, in the home, in industry and public works and in the development of the railroad in New Jersey was shown.

As a special feature of the exhibition an American colonial kitchen and an early blacksmith shop were reconstructed and equipped, displaying a comprehensive assemblage of rare and interesting implements. Having the opportunity to see these tools in their proper settings contributed considerably to the interest of the 42,472 museum visitors and 209 school and adult groups who saw the exhibit. The kitchen centered around a large fireplace with a Dutch oven, warming oven, crane, notched trammels, a rare sawtooth trammel and numerous kettles, skillets and a long-handled frying pan. Other kitchen utensils displayed were bread toasters, broilers including a fine rotary one, waffle irons, peels, trivets, forks, ladles, skimmers, cake turners, a spice grinder and a wide variety of lighting devices. The blacksmith shop, completely equipped with tongs, hammers, sole knives, rasps, race wheels, nail headers, anvils, swages and a mandrel, featured an eight-foot long bellows which came from a blacksmith shop on Mill street in Vincentown, N. J., which was in operation in the 19th century.

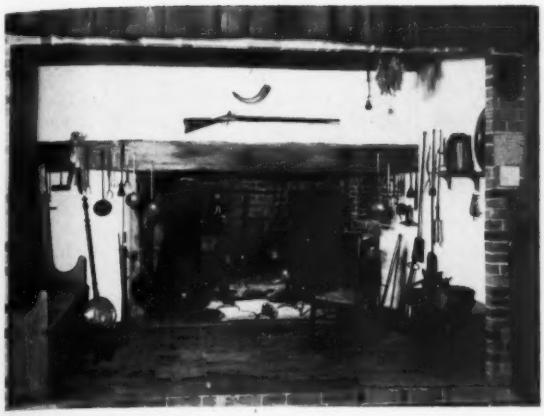
(Continued on Page 12)

General view of special exhibits gallery at the State Museum during the "New Jersey 1674-1850" exhibition.

IRON CAMP STOVE made at Ringwood Forge in Passaic County for General George Washington's Army. American ironmasters played a major part in the ultimate victory of the colonial forces because they were ready and eager to supply the necessary material of war, which was largely made of iron at that time.



Many of the early iron works, isolated in the wilderness to be near water power and a ready wood supply for charcoal, developed complete communities of their own. Such a community was Allaire at the Howell Works in Monmouth County where they had their own church, school and general store. Even script for use within the community was printed. These examples of Allaire script in denominations of $3.00, $2.00, $1.00, 50c, 25c, 12½c and 6¼c as well as a Howell Works coin were shown in the "New Jersey Iron 1674-1850" exhibition at the New Jersey State Museum.



AMERICAN COLONIAL KITCHEN reconstructed and furnished as part of the "New Jersey Iron 1674-1850" exhibition. Items lent by Early American Industries Association members were: coffee roaster, waffle iron, Dutch oven door and jobie pot lent by Roger L. Bridgeman; fire tongs lent by John Cummings; skewer holder, pintle and 2 skewers, open saucer pedestal lamp, pan lamp, ladle, fork, skimmer and cake turner and pewter trencher lent by Edward Durell; pine fireside settle, andirons, crane, sawtooth trammel, roaster and rotary broiler lent by Col. Stanley Howe; flip dog and cake turner lent by K. C. Larabee; and waffle iron lent by Donald Streeter.

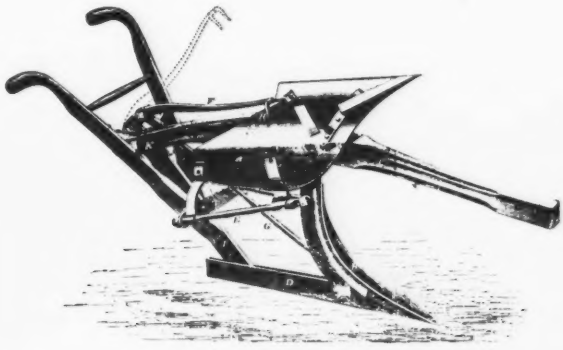
EARLY BLACKSMITH SHOP reconstructed and equipped for the "New Jersey Iron 1674-1850" exhibition at the New Jersey State Museum. Products made by blacksmiths as well as their tools were shown. Items lent by Early American Industries Association members were: barrel lent by Roger L. Bridgeman; sizer with 8 spikes, small wheel with iron rim, pumpkin cutter, and hitching post lent by Col. Stanley Howe; 2 farrier's hammers, 4 nail headers, hoof rest with sole snife, 2 oxen shoes, horseshoe on hoof, horseshoe nails, wheelwright's stand and fly whisk lent by James A. Keillor; stock and dies, dog chain leash, and horse harness chain lent by Donald Streeter.

SIDE HILL PLOWS

(Continued from Page 3)

In America, another approach to the problem was taken by Messers Barnaby and Mooers who were awarded a number of prizes in 1840 and 1841 for a plow which they had patented. This plow was, in effect, a simple double mold board plow which swiveled on the beam by means of a pin arrangement which changed the angle of attack so that first one mold board and then the other became a landside. This ingenious arrangement does not seem to have attained wide spread popularity. This plow is illustrated below.

Another American development was made by Messers Ives and Hiram H. Scoville of Oakland, California who contrived one of several unusual plows. This plow, seen below, was illustrated in the *Mining and Scientific Press* of July 24, 1869. The Scoville plow consisted of a single fixed landside and two mold boards either of which could be lowered into position by means of a hinge. Although there were undoubtedly other variations of this essential mechanism, those described above seem to illustrate the basic principles.



AVAILABLE

Mrs. Pierce writes that in the basement of her home in Leicester, Mass., there is an old blacksmith's bellows, a small forge with hood, an anvil and some tools, a hand operated drill press, and a few other assorted implements which she will give to any member of the Early American Industries Association who will come and take them away. These are all items used in Leicester by persons with whom Mrs. Pierce is acquainted.

COMB HOLDER

Janet MacFarlane has been kind enough to send along this picture of a wool comb, and a recent acquisition of the Farmers Museum, Cooperstown, New York. This new item is a wrought iron holder for the comb which is fastened to a post at right angles and keeps the teeth of the comb upright.

IRON EXHIBIT

(Continued from Page 10)

In assembling the material for this exhibition, the Museum was greatly aided by the interest and cooperation of members of the Early American Industries Association who made both their collections and their knowledge of this colonial industry available. Member exhibitors were: Roger L. Bridgeman of Maplewood; Miss Katherine Garrison, of Arlington; K. C. Larabee of Red Bank; Miss Edna Netter, of Freehold; Roy Tomlinson, of Montclair; Donald Streeter, of Iona; the New Jersey Historical Society through Alexander Wall, Newark; the New Jersey State Library, Trenton; and Rutgers University Library, New Brunswick; all New Jersey members; and James A. Keillor of New York City; John Cummings of Doylestown, Pa.; Col. Stanley Howe of Ottsville, Pa.; and Edward Durell of Columbus, Ohio.

A complete descriptive catalogue with illustrations of the kitchen and the blacksmith shop is available for 25c per copy through the New Jersey State Museum, State House Annex, Trenton 7, N. J.

NEW MEMBERS

CALIFORNIA

Los Angeles: Edna A. Dixon, 220 South Cliffwood (1994)
San Gabriel: Gifford Smith, 101 W. Las Tunas. (1970)

CONNECTICUT

Hartford: Benjamin F. Hubbell, 211 Sisson Avenue. (1987)
Wilton: Stewart E. Gregory, 3 Eden Hill. (1976)

DELAWARE

Wilmington: Eleutherian Mills-Hagley Foundation, Inc. Delaware Hall of Records, 2056 DuPont Building. (1992)

ILLINOIS

Champaign: Mr. and Mrs. Paul A. Peach, 201 S. Draper. (1968)

MASSACHUSETTS

Georgetown: Dr. Harold H. Wagner, 18 Andover St. (1967)
Medford: Mr. Melville T. Nichols, 353 Lawrence Road. (1974)
Marshfield: Mr. and Mrs. Ernest C. Melville, P. O. Box 40. (1972) (1973)
Wellesley Hills: Miss Peggy Green, 16 Livermore Road. (1966)
Barre: Alden P. Johnson, Barre Gazette. (2000)
Chelmsford: Eliot W. Remick, 219 Westford Street. (1979)
Worcester: Mrs. Frank L. Riley, 38 Burncoat Street. (1988)

NEW JERSEY

Atlantic Highlands: Mrs. Reamer Keller, Ocean Boulevard. (1983)

NEW YORK

Brockport: Mrs. Helen Dodson, 48 Holley Street. (1963)
New York City: Hans Hacker, The New York Enthusiasts, Inc., 939 Eighth Avenue. (1971)
Poughkeepsie: Mr. and Mrs. John A. Wallberg, 36 Ferriss St. (1964) (1965)
Rochester: Mrs. Elizabeth G. Holahan, 70 East Boulevard. (1993)
Mrs. Warren S. Parks, 140 Eastland Ave. (1985)
Rochester Public Library, 115 South Avenue. (1996)
Staten Island: Josephine S. Antonini, 33 Central Ave. (1978)
Syosset: Mr. and Mrs. James S. Pigott, 32 Crestwood Drive. (1977)
Syracuse: Mrs. A. S. Berendt, 214 Cambridge Ave. (1986)
White Plains: Mrs. Mae R. Humes, Broad Park Lodge. (1975)
Brooklyn: John Mack, 225 Adams St. (1990)
Hempstead: R. G. Wolford, 35 Perry Street. (1997)
Larchmont: Mrs. John C. Breckenridge, Jr., Larchmont Hills Apartments. (1984)
Lockport: Raymond F. Yates, 190 Windmere Road. (1980)
New York City: R. O. D. Hopkins, 1220 Park Avenue. (1991)
National Society of Colonial Dames in the State of New York, 215 East 71st Street. (1999)

OHIO

Cleveland 10: Dr. Leo Stoor, 15201 St. Clair Ave. (1969)
Cleveland: Colton Storm, 10825 East Boulevard. (1998)

PENNSYLVANIA

Bethlehem: Ralph Schwarz, 525 North New Street. (1989)
Zehenople: Mrs. Harlan Wilson. (1995)
J. Pearl McKinney to Apt. 427, 1140 No. La Salle St. Chicago 10.

CHANGE OF ADDRESS

Mrs. Lura Woodside Watkins, to King Street, Middleton, Mass.

MAIL RETURNED

If you know where the following can be found please notify the Editor.

Mr. Clark Bayley, Merrimac, Mass.
Mr. J. R. Dolan, R. F. D. No. 1, Deerfield, Mass.
Mr. Paul F. Berg, P. O. Box 29, Horsham, Penna.